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PRNC-NRL-10-863d (Rev. 6-54)

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1570				PROGRAM 758
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From: Director, U. S. Naval Research Laboratory, Washington, D. C. 20390
To: Headquarters, Space Systems Division, Air Force Systems Command, Los Angeles, California [redacted] ASCO Program Requirements)

Subj: Program 758 (U)

Ref: Program 758 Meeting of 15 June 1965

Encl: (1) Orbital Requirements Document (C)

1. Enclosure (1) has been revised to include corrections and additions and is being returned as discussed in reference (a).

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Unclassified when enclosures are removed

ORBITAL REQUIREMENTS DOCUMENT

PROGRAM 758

Prepared by

Aerospace Corporation
El Segundo, California

for

Space Systems Division
Air Force Systems Command
Los Angeles, California

June 1965

APPROVED:

Edgar L. Dix

TITLE	INTRODUCTION Purpose and Scope	PREPARED BY ASCO
	APPROVED: NRL, CODE 5170 EDGAR L. DIX	ISSUE DATE

1.1 PURPOSE AND SCOPE

This Orbital Requirements Document (ORD) defines the requirements of Program 758 for U.S. Air Force Satellite Control Facilities (SCF) orbital support of program satellites. This ORD is published to provide a basis to plan and implement necessary equipments and resources to meet specified program requirements.

This document constitutes Program 758 requirements for support by the Satellite Control Facility and complies with Air Force Space Systems Division documentation requirement SSD Exhibit 61-98, Revision A.

TITLE	PREPARED BY
TABLE OF CONTENTS	ASCO
APPROVED: NRL, CODE 5170 EDGAR L. DIX	ISSUE DATE

TITLE INTRODUCTION Distribution List	PREPARED BY ASCO
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Bureau of Naval Weapons, Code RT	3, 4
Bureau of Naval Weapons, Code SMR	5, 6
National Range Division (NRGW) Los Angeles Air Force Station, Air Force Unit Post Office Los Angeles, California 90045	7
Air Force Space Systems Division Los Angeles Air Force Station, Air Force Unit Post Office Los Angeles, California 90045	
SSOCD	8
SSOCE	9
Air Force Western Test Range (WTLRS) Vandenberg AFB, California	10 - 14
Aerospace Corporation P. O. Box 95085 Los Angeles, California 90045	
Satellite Control Office	15 - 24
6594th Aerospace Test Wing, Satellite Test Center Sunnyvale, California	
Attn: TWOP-7	25 - 29

TITLE	PREPARED BY
INTRODUCTION Security Guide	ASCO
APPROVED: NRL, CODE 5170 EDGAR L. DIX	ISSUE DATE

Information or Content	Classification
1. Unrelated reference to the following:	
a. Program Number	U
b. Vehicle Number	C
c. Operations Number	U
2. Relating items listed under 1, above	
a. a to b	S
b. a to c	S
c. b to c	S
3. Overall program	C
4. Prime Contractor (association with program)	U
5. Production, procurement, and supply information	U
6. Test Vehicle or Missile Name	C
7. Vehicle Configuration:	
a. External view	S
b. Military application	S
c. Physical characteristics (length, diameter, etc.)	U
8. Countermeasures information, proven and unproven	C
9. Test Initiation Date	C
10. Orbital Parameters	
a. Velocity	
b. Altitude (Apogee and Perigee)	
c. Right ascension	
d. Period	
e. Orbital adjustments	
f. Attitude control	

TITLE INTRODUCTION Security Guide	PREPARED BY ASCO
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Information or Content

11. Vehicle Subsystems
    a. Command
    b. Telemetry
    c. Guidance
    d. Recovery — N/A
    e. Communication Frequencies — N/A
12. Ground Support Equipmeat — U
13. Data
    a. Raw telemetry data — U
    b. Reduced data
    c. Tracking/Ephemeris data

TITLE GENERAL REQUIREMENTS Mission Description	PREPARED BY ASCO
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2.1 MISSION DESCRIPTION

Program 758 is an orbital satellite program sponsored by the U.S. Naval Research Laboratory. SCF support will be limited to recovery and recording of payload data from HTS. NRL satellites are launched on SLV-2 vehicles having an Air Force Program as a primary mission. The NRL satellites are primary payloads on these launches. Each launch vehicle carries one to six numerically designated satellites. Single satellite launchings are sometimes made from Wallops Island, Virginia, on SLV-1 vehicles. SLV-2 vehicles are launched from Complex 75, Vandenberg AFB, or PALC-1, South Vandenberg.

The program objectives are to obtain gravimetric and solar flare radiation data. Both objectives may be implemented by any multiple satellite launch.

2.2 LAUNCH SCHEDULE

Support is required after injection into orbit of satellites, launches occurring once during the first and once during the third quarter of calendar years 1965, 1966, and 1967. This schedule is expected to continue for an indefinite future period.

TITLE GENERAL REQUIREMENTS Mission Description	PREPARED BY ASCO
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2.3 GENERAL MISSION REQUIREMENTS

The program requires the following support from the SCF:

1. Reception and magnetic recording of telemetry data on all links.
2. Pen recording and near real-time TWX report of first pass separation data. (Not required for Wallops Island launch)
3. Delivery of all recorded program telemetry data by registered air mail to:

   E. L. Dix
   Code 5170

   U.S. Naval Research Laboratory

   Washington, D.C. 20390

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2.4 ORGANIZATIONAL RESPONSIBILITIES

2.4.1 Program 758 is sponsored by the Naval Research Laboratory. The Air Force Western Test Range will be responsible for launch support of SLV-2 vehicles. AFWTR will also provide necessary ephemeris data for acquisition and support of all required passes to the Hawaiian Tracking Station (HTS) with info copy to the Satellite Test Center (STC), Sunnyvale, California.

2.4.2 The STC is responsible for scheduling support operations by all stations of the Satellite Control Facilities (SCF) network. The STC will act on support requests received from AFWTR to direct Program 758 support activities by HTS in accordance with the Orbital Support Plan (OSP) issued in response to this ORD.

2.4.3 The Aerospace Corporation is contractually assigned the responsibility for general systems engineering and technical direction of other contractors' efforts affecting the SCF. This corporation will assist the program sponsor and AFWTR as technical advisor for implementation of program objectives through SCF support.

2.4.4 The U.S. Air Force Space Systems Division, Deputy for Space Test Operations (SSO) is responsible for implementation of required SCF support.

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TITLE DETAILED REQUIREMENTS	PREPARED BY ASCO
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3.2 Telemetry Requirements

3.2.1 Separation Data

Samples of data from all links with instructions regarding interpretation of separation data will be sent to SSO for insertion into the OSP. Separation data from all links will be recorded on oscillograph paper, interpreted, and sent by TWX to NRL, Building 350, South Vandenberg AFB, within 30 minutes of first pass reception at HTS. The message format will be:

Demodulation of FM data from IRIG Channel 3, Links 1 and 2, and IRIG Channel 4, Links 3 and 4, is required for oscillograph recording of separation data. High transient response is required to observe separation spikes.

3.2.2 Payload Telemetry

Payload telemetry consists of one telemetry link on each satellite in orbit as shown in Table 3.2.1. Where satellite separation is slight, data from a group of satellites will be received with a single antenna system. Where separation becomes too great for reception of all required data with a single antenna system, AFWTR and the STC shall coordinate support to divide coverage between San Nicolas Island and HTS so loss of data is minimized. Payload telemetry shall be received, detected, and recorded on 7-track, $\frac{1}{2}$ inch magnetic tape, at $7\frac{1}{2}$ ips using tape speed control.

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Requirements

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TABLE 3.2.1

Telemetry Requirements

[illegible]	FREQUENCY [illegible]	MODULATION	DIRECT CHANNELS	COMM CHANNELS	COMMUTATOR SPEED X SEC	REQUIRED SUPPORT
	136.500	FM/AM	IRIG 4,5, 6,7, & 8	IRIG 3	2 RPS x 16	Composite tape all daylight passes.* Pen record Channel 3 1st orbit only.
2	136.530	FM/AM	IRIG 5&6	IRIG 3 IRIG 4	2 RPS x 16 2 RPS x 16	Composite tape all passes ±4 hrs. of local noon for 2 weeks after launch. Pen record Channel 3 1st orbit only.
3	136.740	FM/AM	IRIG 5,6, & 7	IRIG 3,4	2 RPS x 16	Composite tape all passes ±4 hrs. of local noon for 2 weeks after launch. Pen record Channel 4 1st orbit only.
4	136.770	FM/AM	IRIG 5,6 7, & 8	IRIG 3 IRIG 4	2 RPS x 32 2 RPS x 32	Composite tape all passes ±4 hrs. of local noon for 2 weeks after launch. Pen record Channel 4 1st orbit only.
5	136.890	FM/AM	IRIG 4,5, 6,7, & 8	IRIG 3	2 RPS x 16	Composite tape of all daylight passes.*
6	136.530	FM/AM	IRIG 3,4, 5,6,7 & 8	IRIG 3	2 RPS x 16	Composite tape of all daylight passes.

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* NOTE: A daylight pass is defined to include all passes when the satellite is in sunlight for at least half of the available reception time at the station. WTR will provide determination of daylight passes in computation of look angles from equator crossing data supplied by NORAD, SPADATS, OR SPASUR bulletins.

3.2.2.

50 Kc on one track for flutter & wow.

TITLE

VEHICLE INFORMATION
Orbital Parameters

PREPARED BY

APPROVED:
NRL, CODE 5170

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4.1.1 Orbital Parameters

All Program 758 satellites launched from AFWTR are injected into near circular orbits with the following parameters:

Inclination	$70^\circ \pm 3^\circ$
Altitude	500 nautical miles
Eccentricity	Less than 0.02
Period	103.0 minutes

NRL launches from Wallops Island have the following parameters:

Inclination	$60^\circ \pm 3^\circ$
Apogee	545 nautical miles
Perigee	360 nautical miles
Period	101.6 minutes

4.1.2 Injection Parameters

AFWTR launches:

Latitude	Longitude	Altitude	Velocity
25.8°S	50.3°E	500 NM	24,340 FPS

Wallops Island launches:

Latitude	Longitude	Altitude	Velocity
23° N	59° W	363 NM	24,954 FPS

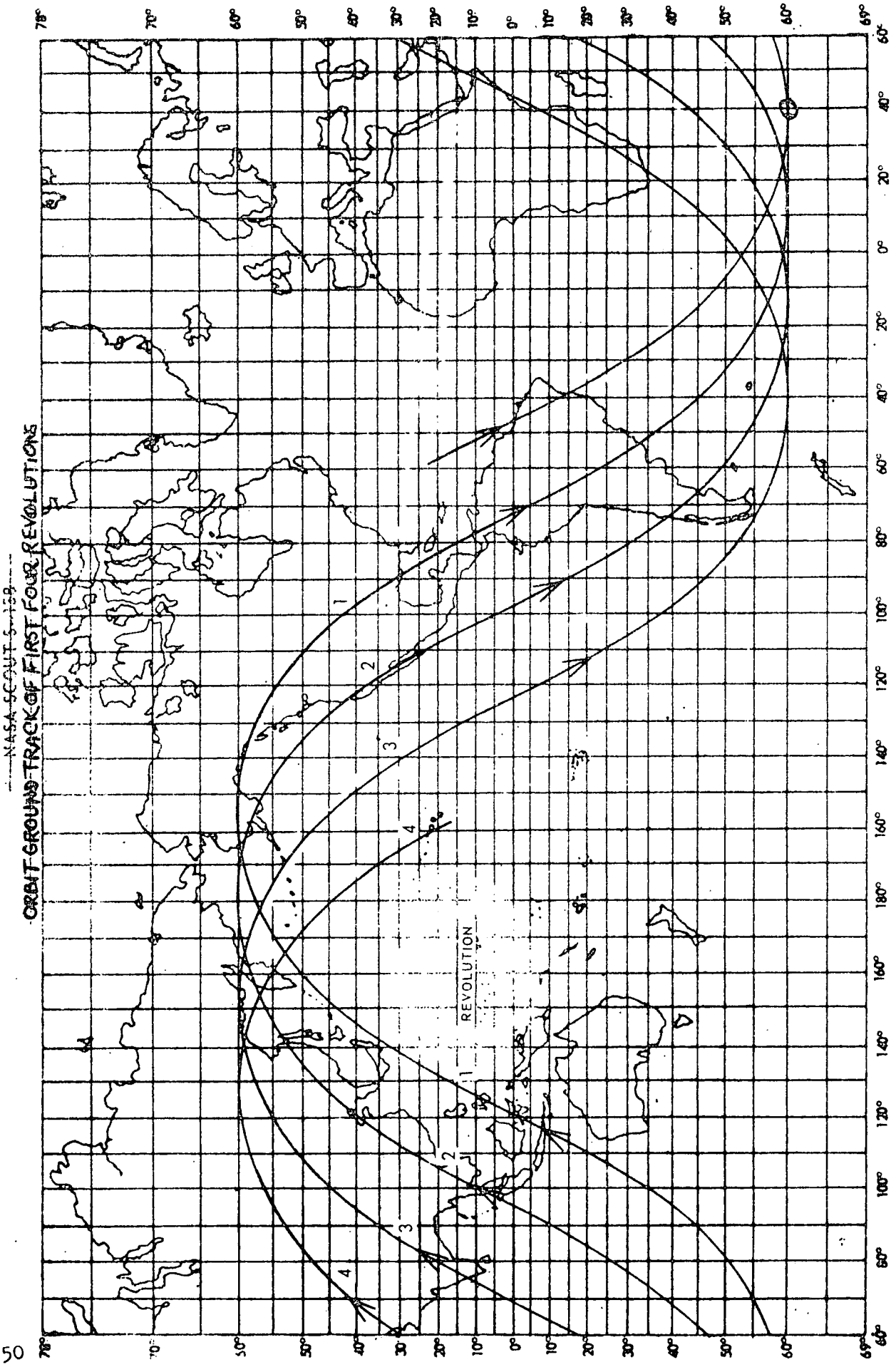
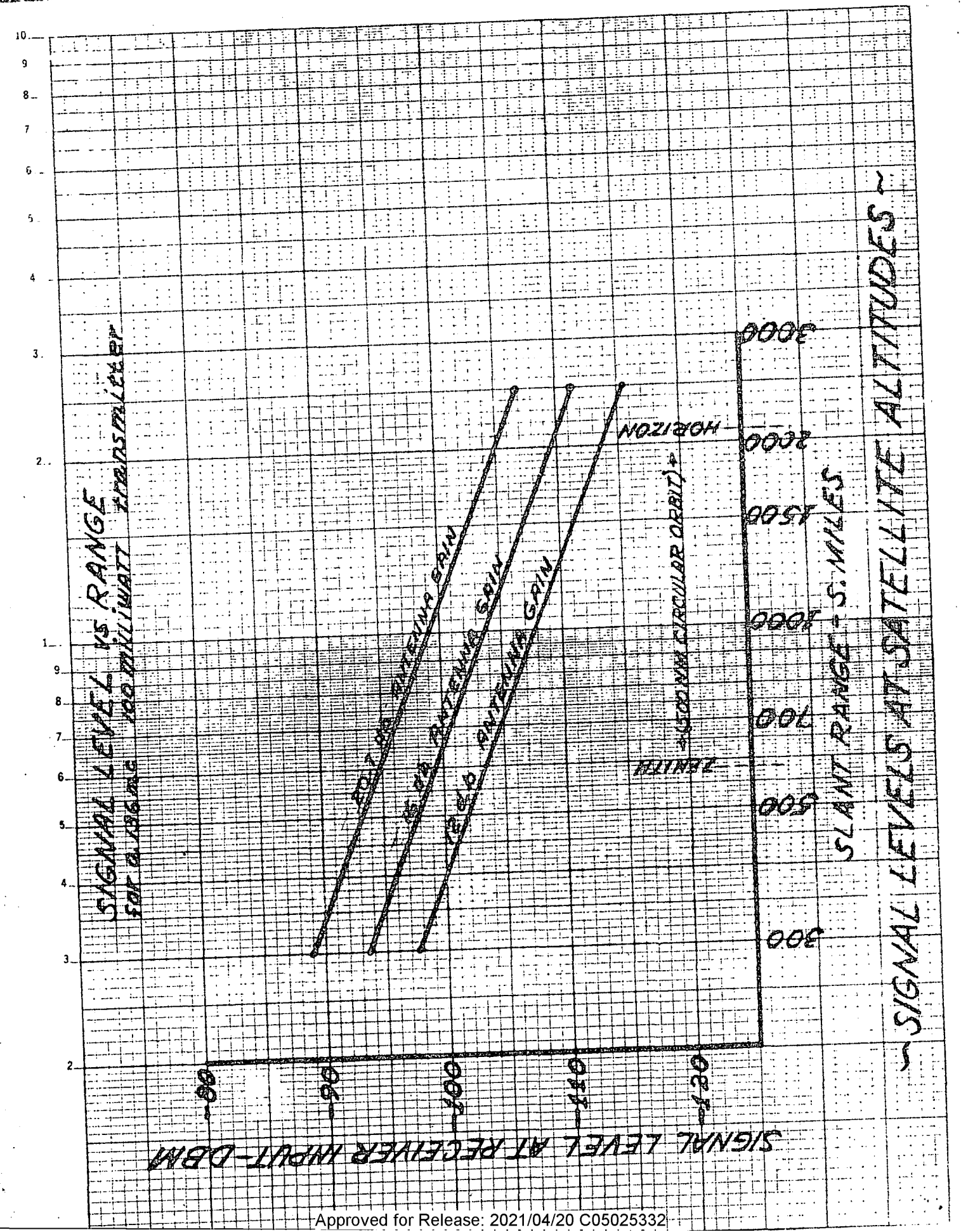


FIGURE XXXXX
GROUND TRACK MAP



TITLE		PREPARED BY ASCO
VEHICLE INFORMATION Telemetry Transmitter Characteristics		
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4.2.1 Telemetry Transmitter Characteristics

All telemetry transmitters have the same characteristics. All are fixed tuned to carrier frequency with a stability of $\pm$ 0.0001 mc/^{o}C. Bandwidth at 60 db is 0.0[illegible] mc. Emission is AM at an average power of 0.1 watt.

Block diagram. - Gain link calculation - xmtr ite., 10 db margin. - [illegible] loss - xmtr output - Mercator Plot/w orbital traces.

Input Signal levels.

TITLE VEHICLE INFORMATION Operations Schedule	PREPARED BY ASCO
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4.3.1 Operations Schedule

Payload Launching Number	
1	July 1965
1	November 1965
1	1st Qtr CY 1966
1	3rd Qtr CY 1966
1	1st Qtr CY 1967
1	3rd Qtr CY 1967
1	1st Qtr CY 1968
1	3rd Qtr CY 1968

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